REMARKS

This paper is filed in response to the official action dated March 25, 2009 (hereafter, the "official action"). This paper is timely filed.

Claims 1, 4, 5, 8-13, 20-27 and 30-34 are pending in this application.

The independent claims have been amended as to form, specifically to use commas demarcating wherein clauses in place of semicolons.

I. CLAIM REJECTIONS – 35 U.S.C. §§ 102(B) & 103(A)

Claim 30 has been rejected as anticipated by Sakamoto, U.S. Patent 5,594,463. Claims 1, 4, 5, 10-13, 20, 22, 25-27, 32 and 34 have been rejected as obvious over Sakamoto in view of Everitt, U.S. Patent Publication 2002/0167471. Claim 31 has been rejected as obvious over Sakamoto in view of Saller et al., U.S. Patent 4,766,367. Claims 8 and 24 have been rejected as obvious over Sakamoto in view of Everitt and in view of Koyama, U.S. Patent 6,730,966. Claims 9 and 23 have been rejected as obvious over Sakamoto in view of Everitt and in view of Young et al., U.S. Patent 5,075,596. Claim 21 has been rejected as obvious over Sakamoto in view of Everitt and in view of Rutherford, U.S. Patent 6,861,810. Claim 33 has been rejected as obvious over Sakamoto in view of Everitt and in view of Sobel, U.S. Patent 3,714,374.

Applicant respectfully traverses the rejection. While the examiner's removal of previous grounds for rejections is appreciated, applicant maintains that none of the rejections, new or otherwise, are factually supported. Furthermore, the office action has failed to establish a *prima facie* showing of obviousness. The below remarks discuss the independent claims in order.

A. Independent claims 1 and 13

For convenience sake, claims 1 and 13 are considered together below, because of the general similarity of their subject matter. Both of these claims stand rejected based on a purported combination of Sakamoto and Everitt.

1. Sakamoto Does Not Disclose a Maximum Voltage Detector, As Recited

Claim 1 recites, *inter alia*, display driver control circuitry that includes "a maximum voltage detector to detect a maximum voltage of said drive line sensed voltages." The Examiner asserts (at page 5 of the Office Action) that Sakamoto discloses "a maximum voltage detector to detect a maximum voltage of said drive line sense voltages (device performing steps S108 and 110, the highest degree of voltage is detected, column 7 lines 47-50)." Applicant respectfully, but strongly disagrees.

Simply put, Sakamoto does not disclose a maximum voltage detector. The portion of Sakamoto pointed to be the Examiner does not describe detecting a maximum voltage, is instead directed, at least on this point, to detecting a difference voltage.

The language to which the Examiner refers states: "In the steps S108 and S110, in short, the voltage difference between the voltage at the portion, where the voltage is increased in the highest degree, and the voltage at the electric source, is obtained." From the discussion of Figure 6, the "portion" appears to mean terminal A; and the language "where the voltage is increased in the highest degree" appears to mean a property of terminal A. This language would therefore describe only that the voltage difference between terminal A, where the voltage is increased in the highest degree, and the electric source is obtained for the steps S108 and S110. This makes technical sense, because it would be preferable to measure the voltage where this is highest, that is taking into account any voltage drop across electrodes and the like within the passive matrix display. However, regardless of that, Sakamoto's computed voltage difference does not describe a maximum voltage detector as recited in the claims.

The recited maximum voltage detector of claims 1 and 13 detects "a maximum voltage of said drive line sensed voltages." There is nothing in Sakamoto that describes detecting sensed line voltages (e.g., on a set of simultaneously driven lines) and then making an assessment of which ones of these is at the maximum. In fact, to this point, the examiner expressly acknowledges (page 6 of the Office Action) that "Sakamoto **does not** specifically disclose a drive voltage sensor for sensing the voltage on each said display drive line." As Sakamoto does not disclose such a drive voltage sensor, one cannot fairly

maintain that Sakamoto describes a maximum voltage detector that detects "a maximum voltage of said drive line sensed voltages."

Further to this point, terminal A is connected to a single line, which suggests (if not demonstrates) that Sakamoto would not teach or suggest sensing voltages of different drive lines. Only one line (or maybe two with terminal B) is used for determining a difference voltage across terminal A.

Beyond this though, a person of ordinary skill would not be motivated to sense different drive line voltages, because in each drive line should be operated at the same voltage level.

In Sakamoto, for example, the EL elements are either on or off (see, for example, the paragraph spanning columns 6 and 7; Figure 6, in particular switching elements 96-0,1; and Figures 9a and 9b and the accompanying description of column 8 lines 16-38). Because the EL elements are only either on or off, rather than being driven with a variable brightness level, all the ON the EL elements will be driven at the same binary ON level voltage (Figures 9a and 9b). Therefore, absent some teaching or suggestion to the contrary, one would not be motivated to detect a maximum voltage amongst different drive lines, Sakamoto, because each drive line, when ON, would have substantially the same level.

For these reasons alone, the rejection of claims 1 and 13 are traversed.

2. Sakamoto Does Not Disclose Detecting a Difference between a Maximum Voltage and a Supply Voltage, as Recited

As noted above, Sakamoto does not teach detecting a maximum voltage of drive line sensed voltages. *A fortiori*, Sakamoto cannot be said to teach "a difference detector to detect a difference between said maximum voltage and said supply voltage," as recited in claim 1.

For this reason alone, the rejection of claims 1 and 13 are traversed.

3. Sakamoto Does Not Disclose a Comparator to Compare the Difference with a Threshold Defining an Estimated Compliance Limit of a Constant Current Generator, as Recited

The office action asserts that Sakamoto discloses "a comparator to compare said difference with a threshold defining an estimated said compliance limit of a said constant current generator." Applicant respectfully traverses.

In particular, contrary to the office action, Sakamoto does not disclose calculating the difference between a maximum voltage and a supply voltage, neither at Column 7, lines 51-61, nor elsewhere. It is already noted above that Sakamoto does not determine a maximum voltage. Beyond that, however, Figure 7 and the accompanying descriptions discuss that the voltage at terminal A is used to obtain the forward voltage drop of the EL element, Vf (column 7 line 41) and used to estimate a driving voltage (column 7 line 45). Step 114 (highlighted by the examiner) checks "whether the maximum value of the driving voltage Vd able to be set, is greater than the estimated driving voltage Vd or not" (column 7 lines 51-53). But this determination does not teach or suggest "after calculating the difference of the maximum voltage and the supply voltage, the value is compared to the estimated driving voltage Vd." Sakamoto does estimate a voltage drop ΔV (column 7 lines 37), and does determine a voltage difference Vx (column 7 lines 41-42), but Sakamoto does not calculate the difference of the maximum voltage and the supply voltage and compare this to the estimated driving voltage. Instead "the driving voltage Vd at the minimum limit necessary for driving the EL element, is estimated from the obtained voltage drop Vf and the current value set beforehand (step S112)" (column 7 lines 43-46), and Sakamoto then checks whether the maximum value of the driving voltage Vd able to be set is greater than this (column 7 lines 51-53). The only other place the current is apparently mentioned is at column 7 lines 37-40, which refers to calculating a voltage drop ΔV from a driving current and electrode resistance values.

In other words, the voltage difference in Sakamoto is "the voltage difference Vx between the detection terminal A and the GND, or between the detection terminals A and B." Column 7, lines 35-37. Terminal A and terminal B and ground can be seen in Figure 6 and these, in effect, measure the voltage drop across the EL element, but not "the difference of the maximum voltage and the supply voltage."

Further still, Sakamoto does not describe comparing a difference with a threshold that defines an estimated compliance limit of a constant current generator. This

can be seen, perhaps most readily, in that Sakamoto calculates a voltage difference based on a (current-dependent) voltage drop across the resistance values of the electrodes, and not across a constant current generator." And moreover to this point, Sakamoto neither teaches nor suggests anywhere within the document use of a threshold defining an estimated compliance limit of a constant current generator. The closest approximation in Sakamoto would be the constant current source 88, which clearly is not used in such a manner.

Therefore, for this reason alone, the rejections of claims 1 and 13 are traversed. Neither Sakamoto, Everitt, or any other art or record teaches the recited subject matter.

In reviewing the office action, in particular the language at the top of page 6 ("then the driving voltage is changed, column 7 lines 51-61, to drive in the compliance limit of the current value set S102, column 7 lines 24-25"), it appears that clarification may be helpful regarding the compliance limit. The reference to "the compliance limit of the current value" identified by the Examiner is not pertinent, as a current value does not have a compliance limit – a compliance limit is a property of a constant current generator, as explained in the instant application. Further, if Sakamoto discloses changing the driving voltage to change the driving current, it is respectfully submitted that this would teach away from the claimed approach, because the claimed approach operates a constant current generator within its compliance limit, while changing the driving voltage does not substantially change the driving current.

4. The Office Action Has Not Satisfied Its *Prima Facie* Burden under 35 U.S.C. 103

To establish a *prima facie* case of obviousness, the examiner must show that all the elements of the claim are taught or suggested in the prior art (MPEP 2143.03 and Federal Register Examination Guidelines for Determining Obviousness, Section III.A.1, Fed Reg., Vol. 72, No. 195, 2007), and if prior art elements are described in the art, the combination of elements must yield predictable results to render a clamed invention obvious. The Supreme Court in *KSR International Co. v. Teleflex Inc.* affirmed that a sufficient showing of obviousness must be made, and that "the key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious." Federal Register, Vol. 72, No. 195, Wednesday, October 10, 2007, Notices, page 57528 (courtesy copy attached). The Supreme Court, quoting *In re Kahn*, admonished

that "rejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR*, 550 U.S. at I, 82 USPQ2d at 1396.

Everitt is recited along with Sakamoto in rejecting claims 1 and 13. However, it is respectfully submitted that one skilled in the art would have no incentive to combine or modify the teachings of Everitt with Sakamoto to sense the voltage on each display drive line since in Sakamoto the voltages on each display drive line are all essentially the same because (as previously mentioned) in Sakamoto the EL elements are either on or off. Therefore, sensing the voltage on one display drive line, as Sakamoto describes, is sufficient (the voltages on all the other display drive lines would be expected to be substantially the same).

It is further submitted that even were one skilled in the art to apply the teachings of Everitt to the arrangement of Sakamoto the result would not amount to the recited subject matter. On the contrary, Everitt teaches "advantageously, the column driver of Figure 3 can replace conventional systems that control pixel light intensity by pulse width modulating (PWM) the signal" (paragraph 64). In Everitt, "in the video display of Figures 3 and 4, each of the elements are driven with a voltage rather than a current, and that voltage varies from pixel to pixel as a function of desired pixel brightness" (paragraph 63). On the other hand, the Examiner will appreciate (1) that Sakamoto is a PWM system using a current drive (see, for example, Sakamoto Figure 3, PWM modulators 48 described at column 5 line 20 onwards) and (2) that therefore one skilled in the art would be taught by Everitt to replace this current driven arrangement with a voltage driven arrangement, which would then require use of a calibration circuit as described in Everitt because the voltage response of the OLED elements of Everitt is not predictable.

Although the current–to–voltage correction table is generated by driving each of the diodes with known current and then measuring the output voltages (paragraph 17 of Everitt), this is for calibration of voltage controlled display elements. Everitt teaches away from control circuitry as claimed where contact current generators drive the display element with a control loop to control the voltage supply. To make use of the calibration circuit of Everitt, the skilled person would need to replace the constant current source 88 of Sakamoto with a voltage drive arrangement, in which case the problem addressed by the present application would not arise.

In any event, for the foregoing reason, the rejections of claims 1 and 13 are traversed.

B. Independent Claim 30

In addition to the foregoing distinctions, some of which also pertain to claim 30, applicant respectfully submits that the Examiner is incorrect in asserting that Sakamoto discloses an arrangement in which a bipolar transistor has an emitter terminal directly connected to the supply voltage. This certainly is not shown in Figure 6 of Sakamoto. In Figure 6 each of transistors 91 is connected to voltage Vd via a resistor, and thus not directly connected to the supply line. Contrast Figure 6, with Figure 4C of the present application, for example, and the descriptions at the top of page 7 (published PCT application), where it is emphasized that there should be no intervening components between the emitter terminal and the power supply line or terminal. One skilled in the art would have no motivation to consider employing the circuit of Hoshino et al as this would teach boosting the supply voltage, which is in direct contradiction to Sakamoto.

The rejection of claim 30 is traversed for at least these reasons.

C. Independent claim 31

In addition to the foregoing distinctions, some of which also pertain to claim 31, applicant respectfully asserts that the Examiner is incorrect in asserting that Saller et al. "teaches using a Wilson current mirror over a simple current mirror [to] produce an increase in output impedance" (page 13 of the Office Action). Saller et al. does assert that "one advantage of this type of current mirror, which is commonly called a Wilson current mirror, is the increase in output impedance at the collector of transistor 5" (column 2 lines 2 – 5). However, this does not make a *prima facie* showing of obviousness.

The Examiner asserts that it would have been obvious to one of ordinary skill in the art to use a Wilson current mirror for the purpose of increasing the output impedance, but in fact increasing the output impedance is undesirable as this degrades the compliance of the constant current generator, which itself is undesirable because, in effect, it can require a higher drive voltage. Therefore, the office action has not provided a *prima facie* showing of some basis for the purported combination, save for impermissibly looking at the present application in hindsight.

D. Independent claims 32 and 34

In addition to the foregoing distinctions, some of which also pertain to claims 32 and 34, applicant respectfully asserts that the Examiner is incorrect in asserting "Sobel discloses a system to find a knee in a current-voltage curve of a said constant current generator" (page 16 of the Office Action). The "knee" that is referred to is a knee in the non-linear response of a display element 21, not of a constant current generator. Further, there is no reference in Sobel, either explicit or implied, to a system/method for dynamically determining a compliance limit of a constant current generator for controlling a supply voltage, as claimed. The reference to the knee in Sobel referred to by the Examiner merely asserts that a potential is applied to raise the energization of the display element above the knee by an amount which is proportional to the instantaneous video level, in effect asserting that the potential needs to be above the knee for a display element to turn on. This concept is unrelated to compliance of a constant current generator.

II. CONCLUSION

In light of the foregoing, Applicant respectfully traverses the rejections of all pending claims, and asserts that this case in condition for immediate allowance.

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Respectfully submitted,

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